

WHAT IS CLAIMED IS:

- 1 1. A multivalent conjugate molecule comprising a carrier protein with at
2 least three different bacterial capsular polysaccharides covalently linked to the carrier protein,
3 wherein the molecule elicits protective antibodies.
- 1 2. The conjugate molecule of claim 1 comprising four different bacterial
2 capsular polysaccharides covalently linked to the carrier protein.
- 1 3. The conjugate molecule of claim 1 comprising five different bacterial
2 capsular polysaccharides covalently linked to the carrier protein.
- 1 4. The conjugate molecule of claim 1 comprising six different bacterial
2 capsular polysaccharides covalently linked to the carrier protein.
- 1 5. The conjugate molecule of claim 1, wherein the carrier protein is
2 selected from the group consisting of C α , C β , tetanus toxoid, diphtheria toxoid, diphtheria
3 toxoid analog CRM197, and a porin protein.
- 1 6. The conjugate molecule of claim 1, wherein the bacterial capsular
2 polysaccharides are different Group B Streptococcus capsular polysaccharides selected from
3 the group consisting of type Ia, type Ib, type II, type III, type V, and type VIII.
- 1 7. The conjugate molecule of claim 6, wherein the Group B
2 Streptococcus capsular polysaccharides are type Ia, type III and type V.
- 1 8. The conjugate molecule of claim 7, wherein the carrier protein is C β .
- 1 9. The conjugate molecule of claim 6, wherein the bacterial capsular
2 polysaccharides are of a size of between 80 and 120 kilodaltons.
- 1 10. The conjugate molecule of claim 6, wherein between about 5 and 20%
2 of the sialic acid residues of the bacterial capsular polysaccharides are covalently linked to
3 the carrier protein.
- 1 11. The conjugate molecule of claim 6, wherein the bacterial capsular
2 polysaccharides are present in equimolar amounts.

1 12. The conjugate molecule of claim 1, wherein the bacterial capsular
2 polysaccharides are *Neisseria meningitidis* capsular polysaccharides selected from the group
3 consisting of A, B, C, W, and Y.

1 13. The conjugate molecule of claim 12, wherein the *Neisseria*
2 *meningitidis* capsular polysaccharides are B, C, and Y.

1 14. The conjugate molecule of claim 12, wherein the *Neisseria*
2 *meningitidis* capsular polysaccharides are C, Y, and W-135.

1 15. The conjugate molecule of claim 12, wherein the carrier protein is a
2 porin protein, tetanus toxoid, or CRM197.

1 16. The conjugate molecule of claim 14, wherein the carrier protein is
2 tetanus toxoid.

1 17. A method of preparing a multivalent conjugate molecule, the method
2 comprising covalently linking at least three different bacterial capsular polysaccharides to a
3 carrier protein.

1 18. The method of claim 17, wherein covalently linking the bacterial
2 capsular polysaccharides to the carrier protein comprises steps of:
3 (a) oxidizing the polysaccharides;
4 (b) coupling the oxidized polysaccharides to the carrier protein.

1 19. The method of claim 18, wherein the polysaccharides are coupled to
2 the carrier protein by reductive animation.

1 20. The method of claim 18, wherein the polysaccharides are conjugated to
2 the carrier protein by a bispacer coupling with a linker.

1 21. The method of claim 17, wherein the carrier protein is selected from
2 the group consisting of C α , C β , tetanus toxoid, diphtheria toxoid, diphtheria toxoid analog
3 CRM197, and a porin protein.

1 22. The method of claim 17, wherein the bacterial capsular
2 polysaccharides are different Group B *Streptococcus* capsular polysaccharides selected from
3 the group consisting of type Ia, type Ib, type II, type III, type V, and type V.

1 23. The method of claim 22, wherein the Group B *Streptococcus* capsular
2 polysaccharides are type Ia, type III, and type V.

1 24. The method of claim 23, wherein the carrier protein C β .

1 25. The method according to claim 22, wherein between about 5 and 20%
2 of the sialic acid residues of the bacterial capsular polysaccharides are oxidized.

1 26. The method according to claim 22, wherein between about 5 and 20%
2 of the sialic acid residues of the bacterial capsular polysaccharides are coupled to protein.

1 27. The method of claim 17, wherein the bacterial capsular
2 polysaccharides are *Neisseria meningitidis* capsular polysaccharide selected from the group
3 consisting of A, B, C, W, and Y.

1 28. The method of claim 27, wherein the *Neisseria meningitidis* capsular
2 polysaccharides are B, C, and Y.

1 29. The method of claim 27, wherein the *Neisseria meningitidis* capsular
2 polysaccharides are C, Y, and W-135.

1 30. The method of claim 27, wherein the carrier protein is recombinant
2 porin B, tetanus toxoid, or CRM197.

1 31. The method of claim 29, wherein the carrier protein is tetanus toxoid.

1 32. A method of preventing or attenuating an infection in a mammal, the
2 method comprising administering to the mammal a multivalent conjugate molecule
3 comprising a carrier protein with at least three different bacterial capsular polysaccharides
4 covalently linked to the carrier protein, wherein the multivalent conjugate molecule is
5 administered in an amount sufficient to elicit protective antibodies against the bacterial
6 capsular polysaccharides.

1 33. The method of claim 32, wherein the carrier protein is selected from
2 the group consisting of C α , C β , tetanus toxoid, diphtheria toxoid, diphtheria toxoid analog
3 CRM197, and a porin protein.

1 34. The method of claim 32, wherein the multivalent conjugate molecule is
2 administered to prevent or attenuate an infection caused by Group B Streptococcus and the
3 bacterial capsular polysaccharides of the conjugate molecule are different Group B
4 Streptococcus capsular polysaccharides selected from the group consisting of type Ia, type Ib,
5 type II, type III, type V, and type VIII.

1 35. The method of claim 34, wherein the Group B Streptococcus
2 polysaccharides are type Ia, type III and type V.

1 36. The method of claim 35, wherein the carrier protein is C β .

1 37. The method of claim 32, wherein the multivalent conjugate molecule is
2 administered to prevent or attenuate an infection caused by *Neisseria meningitidis* and the
3 bacterial capsular polysaccharides of the conjugate molecule are different *Neisseria*
4 *meningitidis* capsular polysaccharides selected from the group consisting of A, B, C, W, and
5 Y.

1 38. The method of claim 37, wherein the *Neisseria meningitidis* capsular
2 polysaccharides are B, C, and Y.

1 39. The method of claim 37, wherein the *Neisseria meningitidis* capsular
2 polysaccharides are C, Y, and W-135.

1 40. The method of claim 37, wherein the carrier protein is recombinant
2 porin B, tetanus toxoid, or CRM197.

1 41. The method of claim 39, wherein the carrier protein is tetanus toxoid.

1 42. A pharmaceutical composition comprising a multivalent conjugate
2 molecule comprising a carrier protein with at least three different bacterial capsular
3 polysaccharides covalently linked to the carrier protein and a pharmacological acceptable
4 carrier, wherein the multivalent conjugate molecule is in an amount sufficient to elicit
5 protective antibodies against the three different bacterial capsular polysaccharides.

1 43. The pharmaceutical composition of claim 42, wherein the carrier
2 protein is selected from the group consisting of C α , C β , tetanus toxoid, diphtheria toxoid,
3 CRM197, and a porin protein.

1 44. The pharmaceutical composition of claim 42, wherein the bacterial
2 capsular polysaccharides are different Group B *Streptococcus* capsular polysaccharides
3 selected from the group consisting of type Ia, type Ib, type II, type III, type V, and type VIII.

1 45. The pharmaceutical composition of claim 44, wherein the Group B
2 *Streptococcus* capsular polysaccharides are type Ia, type III and type V.

1 46. The pharmaceutical composition of claim 45, wherein the carrier
2 protein is C β .

1 47. The pharmaceutical composition of claim 42, wherein the bacterial
2 capsular polysaccharides of the immunogenic molecule are different *Neisseria meningitidis*
3 capsular polysaccharides selected from the group consisting of A, B, C, W, and Y.

1 48. The pharmaceutical composition of claim 47, wherein the *Neisseria*
2 *meningitidis* capsular polysaccharides are B, C, and Y.

1 49. The pharmaceutical composition of claim 47, wherein the *Neisseria*
2 *meningitidis* capsular polysaccharides are C, Y, and W-135.

1 50. The pharmaceutical composition of claim 47, wherein the carrier
2 protein is tetanus toxoid, recombinant porin B or CRM197.

1 51. The pharmaceutical composition of claim 49, wherein the carrier
2 protein is tetanus toxoid.